MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL (A constituent unit of MAHE, Manipal)

## IV SEMESTER B.TECH (CIVIL ENGINEERING) END SEMESTER EXAMINATIONS, JUNE 2022 SUBJECT: WATER RESOURCES ENGINEERING [CIE-2255)

**REVISED CREDIT SYSTEM** 

( \_ / 06 / 2022)

Time: 3 Hours

Max. Marks: 50

## Instructions to Candidates:

- Answer ALL the questions
- Missing data may be suitably assumed
- Draw the explanatory sketches wherever required.

Q.No												Marks	CO
1.	The rate of rain 1.3, 3.2, 4.5, 3.3 this storm was index if initial s Time (min) Rainfall intensity (am/br)	te of rainfall for the successive 20 min period of a 3-hour storm in cm/hr are 2, 4.5, 3.5, 2.5, 2.0, 1.8, 1.5 and 1.0. The corresponding surface runoff from orm was estimated to be 3 .20 cm. Estimate the values of Ø-index and W-if initial storm losses is estimated to be 0.65 cm.    (min) 0 20 40 60 80 100 120 140 160 180   fall 0.0 1.2 3.2 4.5 3.5 2.5 2.0 1.8 1.5 1.0										05	1
2.	The following data is collected from the catchment area of a minor tributary of a river. Estimate: (i) The average depth of runoff; (ii) Peak Application Discharge; and, (iii) Yield from the tributary. Data collected: Catchment area= 1150 ha; Average rainfall intensity= 36 mm/hr; Duration of rainfall = 75 min; Runoff Coefficient= 0.3.											03	2
3.	Distinguish between Weirs and Barrages with neat sketches.											02	5
4.	A culvert is proposed across a stream draining an area of 150 ha. Estimate the 25- year flood if, the rainfall intensity is given by, $I = \frac{1000(T)^{025}}{(t_c + 20)^{0.6}}$ Where I is in mm/hr, Tin years and tis in minutes. Assume that maximum length of travel for water is 4 km and the average slope of the basin is 1 in 60 and runoff coefficient is 0.3. What should be the design flood if a factor of safety of 2.5 is										05	2	
5	desirable Define 'River Training Work'. List out the various any four advantages of Under											03	3
э.	providing river training works.												
6.	Explain the 'Marginal Bund' with a neat sketch.											02	3
7.	Explain the "Summation hydrograph" with a neat sketch. Derive the ordinates of											05	3

	flood hydrograph occurring due to 7cm rainfall occurring for an effective duration 4hr. The Ø-index is estimated to be $0.5$ cm/hr. Base flow may be assumed as $10m^3$													
	7 sec. Given the Time (hr)	0 0 2	$4 \frac{1}{4}$	$\frac{1}{6}$	t hydr 8	ograph	1. 12	14	16	18	20	1		
	4-hr UHO (m <sup>3</sup> /sec)	0 25	38	66	96	120	84	50	30	25	0			
8.	What are spilly	yays? Cla	ecify th	ne snil	lwave	hased	on dif	ferent	criteri				03	4
9.	Discuss the advantages of arch dam over gravity dam												02	4
	For the gravity dam costion shown in the figure find the magnitude of former													
10.	4m 4m 26m 60m 4m 60m	am and N/m <sup>3</sup> .	6m	heir lo		n in a	neat s	d the ketch.	Take	unit	or for weigh	t of	05	4
11.	Explain the various parts of 'Buttress Dam' with their functions.												03	5
12.	State the different types of Cross Drainage Works (CDW), and explain the Under Situations in which they are used.											er	02	5
13.	With a neat sketch write short notes on the following: i) Syphon Aqueduct ii) Ridge Canal											04	5	
14.	Calculate the av and 18 m from 6  m Assume FS = 4/	verage hy the u/s e m 6 m 3 and Sp	draulic nd of th 12 m Gr = 2	B 1 .4.	ient an or for t 8 m	C → 2	uplift r rage fc ] 2 m	D B B B B M B M	res at I l on sa	points ind.	6m, 1	2m	03	5
15.	Explain any three limitations of 'Bligh's Creep Theory'.											03	5	